Asbestos Risk Management Issues for Our Schools

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Introduction

Asbestos is a mineral fiber which was used in many building materials for fireproofing, insulation and decorative purposes, as well as in siding and vinyl tiles. In 1986, President Reagan signed into law the Asbestos Hazard Emergency Response Act (AHERA). This legislation led the United States Environmental Protection Agency (USEPA) to promulgate comprehensive asbestos rules to regulate the inspection, abatement and management of asbestos containing materials (ACM) in schools with kindergarten through the twelfth grades. Under this federal rule, all schools were required to inspect and identify all ACM in their buildings and develop a comprehensive program for abatement and management of these materials. It has now been almost 10 years since the promulgation of this rule and seven years since all asbestos management plans (AMP) were required to be implemented by our nation's schools. Nationally, there has been little information to date regarding the effectiveness of these programs in reducing the risk of asbestos exposures.

The New Jersey Department of Health & Senior Services-Consumer and Environmental Health Services (the Department), in conjunction with the USEPA-National Risk Management Research Laboratory, has been assessing the success of these programs in schools since 1988. Since that time, a series of studies at asbestos abatement sites in New Jersey schools were conducted. The studies documented those asbestos abatement and management activities required under AHERA (EPA Project Summary-EPA/600/SR-94/084, August 1994). The results of the first four years of these studies are being provided to assist and inform schools in managing ACM and, to reduce the risk of exposures in our schools.

Methods

The Department identified 17 schools representing 20 abatement sites for inclusion in the study. During the 1988 initial phase, the participating schools were undertaking large scale asbestos removal projects and were required to follow the procedures outlined in the AHERA regulations. The AHERA regulations were newly implemented by the USEPA, therefore, the primary objective of this portion of the study was to document the compliance with and to determine the effectiveness of these procedures in the field. To collect these data, the Department and the USEPA documented how the asbestos abatement contractors and consultants performed the abatements, final cleaning procedures, visual inspections, and clearance air sampling at each site. Additionally, the Department conducted final visual inspections at some sites and at all sites, jointly collected clearance air samples.

Over the next four years, the Department returned to these 20 abatement sites to continue to evaluate and monitor these schools. Air sampling equipment was set up in the exact locations

where they were located when the abatement occurred (ie, classrooms, hallways, etc.) and were allowed to run during the entire school day. For the follow-up studies, the actual abatement and perimeter areas were not separated since the containment barriers present during the 1988 abatement had been removed. In each of the defined areas, five air samples were collected following the procedures specified in AHERA. The air samples were analyzed in accordance with the nonmandatory transmission electron microscopy (TEM) method also described in the AHERA Final Rule.

In addition to the air sampling, the Department collected information on operations and maintenance activities (O&M) conducted in the areas where the monitoring occurred and performed visual inspections of these areas for the presence of any ACM debris. Finally, the Department reviewed the school's AMP for inspection information and ongoing O&M activities and compared it with the information obtained during the previous monitoring and visual inspections. This information provided insight to the accuracy and effectiveness of the information contained in the AMPs. Bulk samples of suspect ACM (e.g., thermal system insulation, fireproofing etc.) or suspect asbestos containing debris were collected and analyzed by a laboratory to determine the type and percentage of asbestos. It was also recognized that, in the interim since 1988, other sources (e.g., routine maintenance of asbestos containing resilient floor tiles or other O&M activities involving asbestos containing building materials) may have contributed to the levels of airborne asbestos.

Results and Discussion

The results of this extensive study have revealed a substantial amount of information regarding the effectiveness of asbestos abatement and management programs in our schools. The results indicate that the removal of ACM, when appropriate, can be an effective management practice. However, school officials must be aware that improper removal can cause elevated airborne asbestos levels. For example, if ACM is not properly cleaned up, the remaining debris can cause elevated airborne asbestos levels immediately after and/or years after the abatement activity. One of the principle findings of this study included elevated airborne asbestos levels being measured at 45% of the sites studied. One of the causes of these levels was linked to asbestos containing debris remaining from the original abatement work. The asbestos levels associated with the ACM debris from the original abatement continued to be measured up to four years later.

Figures 1 and 2 illustrate the average concentration of asbestos structures per square millimeter of filter area (s/mm^2) measured in the original abatement and perimeter areas as sampled from 1988 through May of 1992. AHERA provides an initial screening criteria of 70 s/mm^2, which is the maximum acceptable asbestos level for the completion of an abatement project. Asbestos concentrations were measured above this level at six (6) of the 20 sites, four years after abatement and while the school was occupied. A number of items were noted to have contributed to this situation. In 1988, some of the asbestos abatement contractors did not properly contain the abatement site, effectively operate the air filtration equipment or remove all of the ACM. Also, the consulting firms conducting clearance air monitoring and inspections

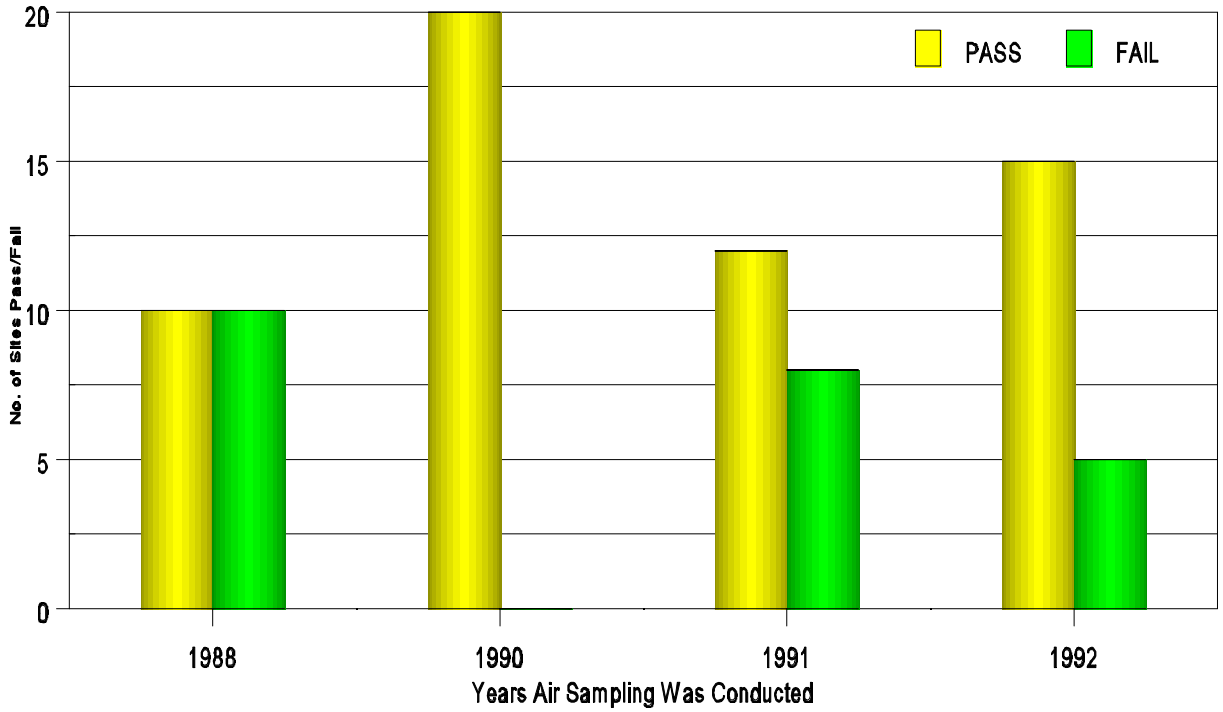

Figure 1 **Number of sites passing or failing the AHERA initial screening criteria in the 1988 abatement area for each year air sampling was conducted. (Note: AHERA Initial Screening Criterion equals 70 s/mm^2)**

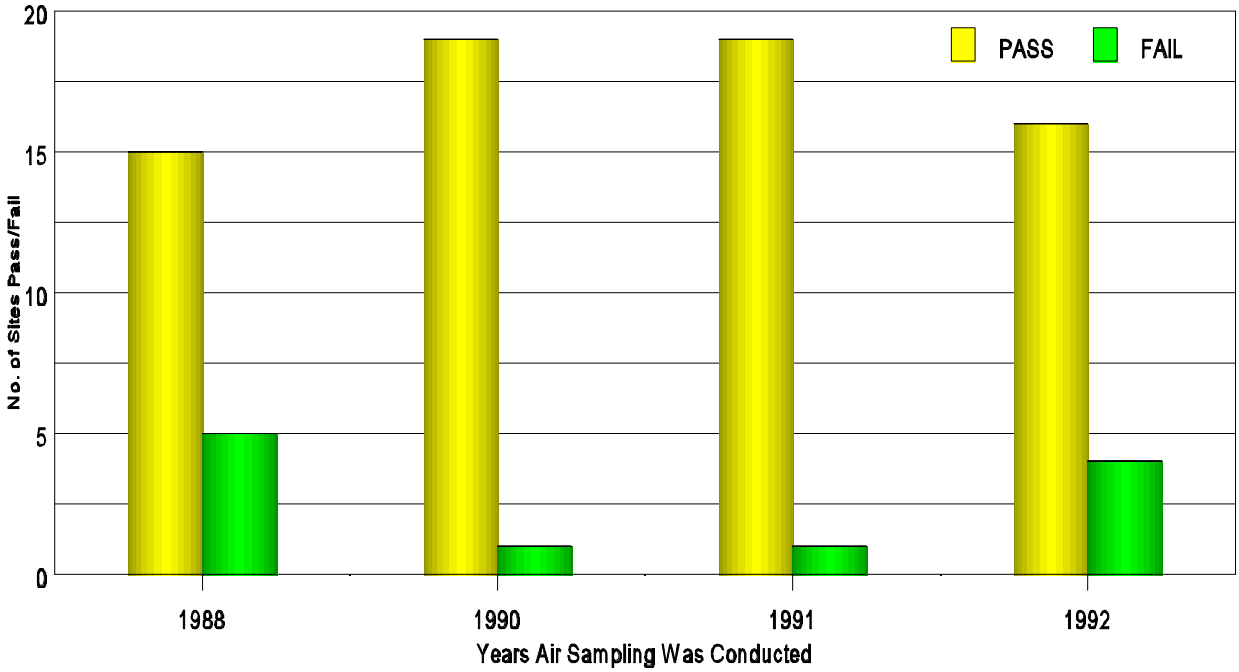

Figure 2. **Number of sites passing or failing the AHERA initial screening criteria in the 1988 perimeter area for each year air sampling was conducted. (Note: AHERA Initial Screening Criterion equals 70 s/mm^2)**

often did not fully understand and follow the AHERA protocols and failed to ensure that all debris was cleaned from the abated area. This was to be accomplished by conducting a thorough, standardized, visual inspection. To assure the absence of asbestos debris, attention to detail in cleaning practices is an essential component of the abatement project. The effectiveness of the cleaning process is evident in the air sampling conducted in 1990 which was conducted after the schools had completed their final cleaning, just prior to the beginning of the school year. As noted in Figures 1 and 2, all the sites monitored had levels below the 70 s/mm^2 criteria.

AHERA requires all school buildings to be inspected for the presence of ACM and an AMP be developed for the control and management of the ACM identified. School officials must also designate a person responsible for ensuring the management of ACM. Additionally, the AMP must be maintained and updated regarding asbestos abatements or maintenance activities, periodic surveillance and reinspection information. Table 1 presents an overall summary of the visual inspections, review of AMP information and air monitoring results from 1991 and 1992, three and four years after abatement, respectively. An alarming 76% of the schools studied had inaccuracies in the AMP relating to material identification or location. Unaware that asbestos material was present, maintenance workers performing routine activities left dust and/or debris after the work was completed. Measurements in the vicinity of where these maintenance activities had occurred revealed elevated airborne asbestos levels during the school day which were likely the result of asbestos dust and debris remaining from the maintenance activity that became airborne during occupied conditions. Records of O&M activities involving ACM must be kept up to date and identified in the management plan. It is the school administration's responsibility to ensure that staff and outside contractors working in the vicinity of any ACM reference the AMP prior to performing their activities. Asbestos management programs must be carefully developed and implemented to minimize the building occupant's exposure to asbestos.

Recommended Action

Provided with this information, what actions should be taken by school officials to reduce the risk of asbestos exposures in our schools? Following the few steps outlined below, school officials will be better prepared to prevent asbestos exposures and staff will become more aware of the asbestos programs in their buildings.

- ☛ School officials and designated persons should increase their awareness and understanding of asbestos abatement and regulations. Training programs certified by states or the USEPA are available for obtaining this information. The school will be better prepared to assess asbestos abatement situations and to obtain necessary services.

- ☛ Following abatement activity, school officials should work with consultants to ensure that all ACM was removed, the area was thoroughly cleaned, a standardized visual inspection was performed, and clearance air monitoring in compliance with AHERA was completed. Through education and training, school officials must understand the importance of these activities and the impact they have on both short and long term asbestos exposures. Properly performing these activities are essential for ensuring that the abated areas are

TABLE 1. SUMMARY OF INSPECTIONS AND AIR MONITORING CONDUCTED IN 1991 AND 1992 AT TWENTY ABATEMENT SITES

Observations	Number of Sites	
	1991	1992
Accuracy of Management Plans		
ACM present, not identified in AMP	14	3
Misidentification of ACM in Plan	5	1
Misidentified location of ACM in Plan	1	1
Residual Debris		
Asbestos containing debris present from the 1988 abatement	14	4
Other asbestos containing debris present	10	3
Airborne Asbestos levels measured		
$\geq$70 structures/sq. millimeter (s/mm^2)*	8	6
Sites with elevated airborne asbestos levels where potential sources were identified	9	9

* The AHERA maximum acceptable airborne asbestos level for the completion of an asbestos abatement project.

safe for re-occupancy.

- School officials should evaluate the effectiveness of their O&M program and compliance with asbestos periodic surveillance requirements. For example, areas that have undergone asbestos removal or an O&M activity (involving ACM) should be thoroughly reinspected for the presence of residual asbestos debris. If asbestos debris is found, thorough cleaning and follow-up air monitoring should be conducted.

- ☛ Each school must maintain and update it's AMP to keep it current with ongoing O&M activities, periodic surveillance, inspection/reinspection and response/post-response actions. Each school should ensure that workers who may disturb ACM are aware of changes in the AMP.

The USEPA and the Department recommend a proactive, in-place management program whenever ACM is present in buildings. Removal is required only when necessary to prevent significant exposures to airborne asbestos during routine building maintenance and renovation activities. This study indicates that improperly performed asbestos removal, faulty O&M activities, or ineffective asbestos management programs can cause environmental exposures to airborne asbestos. These findings demonstrate that school officials must increase their awareness of asbestos issues, improve the oversight of asbestos abatement and management programs and improve lines of communication among school employees. Only through effective asbestos management programs can schools begin to control and reduce the risk of asbestos exposures in our schools.